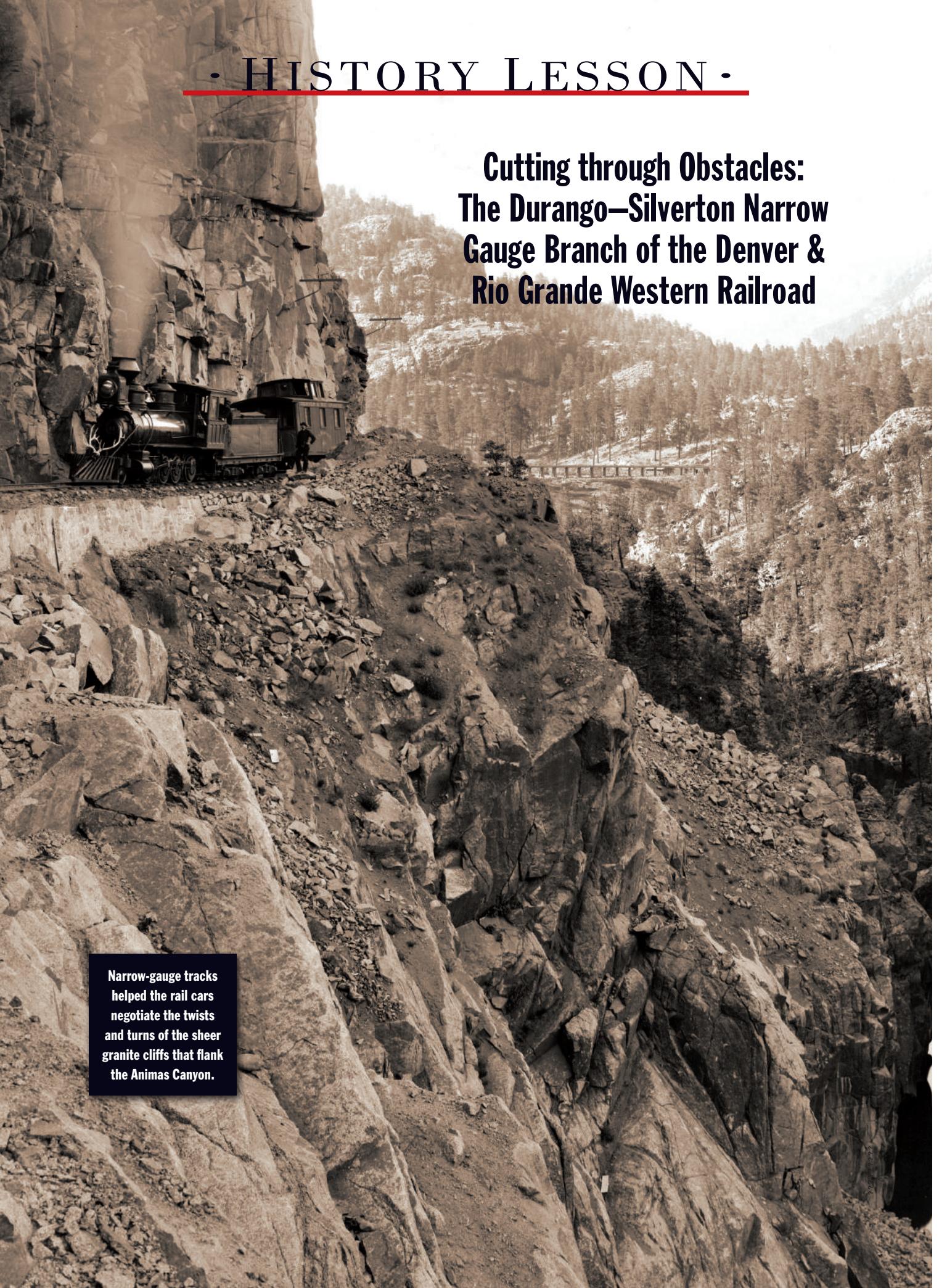


# - HISTORY LESSON -

## Cutting through Obstacles: The Durango—Silverton Narrow Gauge Branch of the Denver & Rio Grande Western Railroad



Narrow-gauge tracks helped the rail cars negotiate the twists and turns of the sheer granite cliffs that flank the Animas Canyon.

WHEN GOLD WAS DISCOVERED in southwestern Colorado in 1860 by prospector Charles Baker, many Americans believed the remote region would be their ticket to getting rich. After the Civil War, miners and dreamers headed toward the town of Silverton.

There was silver and gold there, to be sure, but the small mining community, founded in 1874, was situated 9,300 ft above sea level in a valley ringed by the towering San Juan Mountains. It was extremely difficult to transport people or supplies there with wagons and pack mules, and extremely difficult to transport ore out.

To manage the feat required the construction of the 45 mi Durango—Silverton Narrow Gauge Branch of the Denver & Rio Grande (D&RG) Railroad, a pioneering effort in using narrow-gauge tracks to reach previously inaccessible parts of the American West.

Historian Duane A. Smith, in his book on the history of the railroad, *Durango & Silverton Narrow Gauge: A Quick History* (Lake City, Colorado: Western Reflections Publishing Company, 1998), wrote that a successful mining community required “rich and plentiful ore bodies, money for investment and development and the best possible transportation.”

Silverton lacked the third. In Smith’s book, Alfred Camp, a banker of the era, described one of the mountain routes into Silverton as “almost an impassable road winding upward.” Wagons had to be held down by “ropes or chains.” Trees were used to anchor them. Camp concluded that it was “as hard to get an empty wagon out as to bring a loaded one in.”

Rudimentary roads and trails were not the answer, but the iron horse was. The railroad was already pushing across the West; the first transcontinental link was completed in 1869, around the time that settlers and prospectors were pouring into the Colorado Territory (Colorado became a state in 1876). Leaders in the region knew rail was critical if Colorado was to have any future at all.

In 1870, William Jackson Palmer, a former Union Army general, founded the D&RG Railroad. An experienced railroad manager and civil engineer, Palmer left a lasting mark on Colorado, establishing, among other places, Colorado Springs, Alamosa, and Durango.

Palmer dreamed of a north-south train route from Denver to Mexico that would connect with American transcontinental routes. And he dreamed of not just building rail lines around the Rocky Mountains but through them. The D&RG line traveled south from Denver to Colorado Springs, Pueblo, and Walsenburg, and then west along the Colorado—New Mexico border, finally reaching Durango in 1881.

According to Smith’s book, while the fair-minded Palmer

dreamed of taking care of his workers, including building towns with schools and bathhouses, his railroad drove a hard bargain with the communities it passed on the way. When small Animas City wouldn’t capitulate to the company’s “unspecified demands” regarding the arrival of the railway to the far corner of the young state, Palmer set up a town nearby—Durango, in 1880—thus banishing Animas to the footnotes of history.

According to Jeff Ellingson, curator of the Durango & Silverton Narrow Gauge Railroad and Museum, which currently operates the train line as a tourist attraction, surveyors and civil engineers began plotting a route for the line between Durango and Silverton in 1879. By August 1881, construction of the extension was under way.

Durango was booming in anticipation of rail access to silver country. In the 1870s, “people were flocking to that area,” Ellingson says. Many naively thought they were going to get rich. Most did not. Many would-be miners instead wound up laying track for the D&RG.

Although surveying and later building the initial stretch of the extension, along the Animas River, was not too difficult, the terrain became much trickier north of a town called Rockwood. There, the route entered the Animas Canyon and ran right into a wall of pink Baker’s Bridge granite. “It’s like a plug in the mouth of the Animas Canyon,” says Ellingson. “It had to be dealt with.”

Palmer’s team had already struggled to map the route along the canyon walls, with surveyors dangling over the canyon’s cliffs to get level readings. Along a 2 mi stretch of the canyon that they dubbed “the high line,” workers would have to do that and more. They started at the top of the cliff, where they could get a good footing, and drilled a series of holes by double jacking; two workers with double jacks (hammers) would alternately strike a steel drill rod that was

being held and turned by a third worker. They then filled the holes with black powder, lit a fuse, and moved away before the blast detonated.

This would open up a seam into which larger amounts of black powder would be poured and fired, breaking the rock free. The bench formed by the explosion would then be the next area from which the workers drilled, moving down the cliff face until they reached the survey line.

The workers, Ellingson says, “were pretty fearless. You talk about a dangerous job and working with explosives.” He says accounts of the construction indicate that workers would set the charges, light the fuses, and then go to lunch, as the explosions sounded nearby.

One time, several D&RG executives toured the construction site while the workers were at lunch, not knowing that fuses had already been lit. “Fortunately they saw the fuses burning, and they got out of there, and they weren’t hurt. But it was a



William Jackson Palmer, a civil engineer and a former Union Army general, founded the Denver & Rio Grande Railroad as a north-south route from Denver to Mexico.

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close call," Ellingson says. Amazingly, no lives were lost on this or any part of the 45 mi line.

A natural shelf on the canyonside was supplemented with crib work, according to John B. Norwood in his book, *Rio Grande Narrow Gauge* (Forest Park, Illinois; Heimburger House Publishing Company, 1983). To secure the cribbed walls, workers had to "drill deep holes in the floor of the new grade in which anchor rods were placed. After the anchors were in place, molten lead was poured in the holes to lock the anchors in place and stop corrosion." Norwood notes that these "original cribs and their associated iron work" were in good condition 100 years after they were built.

In addition to grading the rail line and laying tracks, crews had to build roads into the canyon to access the rail line and haul huge pieces of steel for bridges into the area. In total, D&RG built seven wooden bridges, all of which were subsequently rebuilt with iron and/or steel.

The workers faced other hardships as well. The brutal winters meant the line had to be built in two phases: late summer and fall of 1881 and spring and summer of 1882. Ellingson says that 300 workers who built the rail and their families lived out of boxcars. According to writer Robert T. Royem, in his book *An American Classic: The Durango & Silverton Narrow Gauge Railroad* (Durango: Limelight Press; 1995), some workers even dug caves in the hillside near Rockwood.

Critical to the success of the line was Palmer's decision to build narrow-gauge track. According to a 1962 report by the National Park Service (*Durango-Silverton Narrow Gauge Railroad, a Study*), most narrow-gauge lines used a 3 ft gauge instead of the wider, standard 4 ft 8.5 in. gauge.

The advantages of narrow gauge were that the line could be built "at least 37 percent" more cheaply and required "less equipment weight per ton of pay load." Narrow-gauge lines could also be constructed along curves with tighter radii, which better enables them to traverse rugged terrain.

The proliferation of rail lines through Colorado also turned the state into an important player in the young American steel industry. According to the park service, the Colorado Coal and

Iron Company, a subsidiary of the D&RG, rolled its first steel rail in Pueblo, in 1882: "58 tons of 30-pound rail were purchased by the D&RG for \$70 a ton, and shipped to the Silverton 'Extension.'" Eventually, D&RG built 1,600 mi of narrow-gauge lines in Colorado and Utah.

Once the railroad bed had been graded, workers were able to lay ties and rail at a furious pace, says Ellingson. "It was an extremely organized process."

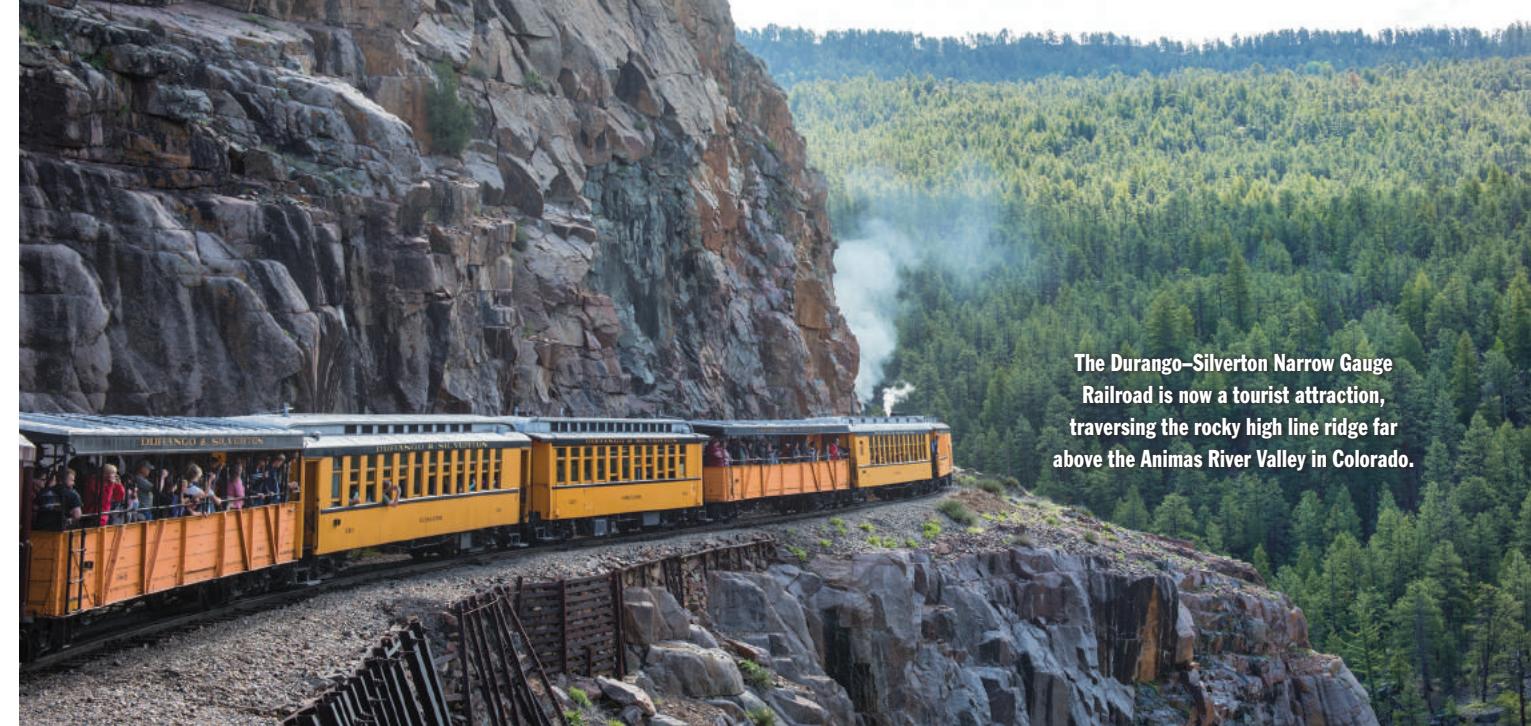
Nevertheless, Palmer, fearing his investors would pull out if they knew that he was, as Ellingson puts it, "trying to do something that was impossible," prohibited photography of the railroad's construction. Palmer ultimately hired famous landscape photographer William Henry Jackson to photograph the scenic railway—but only after the line opened in 1882.

The first passenger train on the line pulled into Silverton on July 8, kicking off a days-long celebration. Train service quickly supercharged the region's fortunes. The line cut travel time between Silverton and Durango from three days to 3.5 hours. "There was this enormous leap forward in time," Ellingson says. Freight costs dropped from \$60 a ton to \$12, and, according to Royem, Silverton's population more than doubled in less than three years. According to Smith, the total produced value of gold, silver, lead, and copper rose from \$62,242 in 1880 to \$2,560,129 by 1895.

Durango prospered too; its lower elevation provided the agricultural base to feed the fast-growing region, and its abundant coal deposits powered the trains to Silverton. Durango was also the home to a smelter, which crushed the ore and filtered out bits of waste rock before the ore was shipped to the U.S. Mint in Denver.

In an interview with *Civil Engineering*, Smith notes that the area was also rich in gold, copper, zinc, and lead. "We were in many ways a mineral treasure-house," Smith says.

The region's initial boom lasted until the Panic of 1893, a major depression that caused silver prices to plunge and wiped out much of the local economy. Silver prices dropped from just over a dollar an ounce to \$0.63 (and eventually to \$0.40 an ounce). Ten mines in Silverton closed.



The Durango-Silverton Narrow Gauge Railroad is now a tourist attraction, traversing the rocky high line ridge far above the Animas River Valley in Colorado.

And despite the achievement of building the rail line, the Rockies remained a formidable opponent. In his book, Smith related an incident in 1897 when an engineer was killed when his "locomotive collided with a rock. The winter weather, snow slides, varying freight shipments, and seasonal passenger travel...bedeviled the Silverton extension."

Silverton's population shrank from a few thousand to only a few hundred. As if the silver crash wasn't bad enough, a flu epidemic in 1918 left the small town with the highest death rate in the country. Silverton limped along, but "when you're not hauling ore, the railroad is going to suffer," Ellingson explains. "By the end of the depression, things were on pretty shaky ground."

Durango continued to thrive as an agriculture and coal mining center despite losing much of its downtown to a fire in 1889. But its smelter was "down to almost nothing by the 1920s," Smith says. An unlikely—and as it turned out, not altogether welcome—savior emerged for Durango in the 1940s, as the Manhattan Project got under way in Los Alamos, New Mexico. Because Southwest Colorado had plenty of uranium, the smelter began to process mined uranium into yellowcake, which was then shipped to New Mexico.

"There was not a lot of safety there," says Ellingson. "These guys were working, they were glad to have jobs." But they were coming home with dust on their clothes, making themselves and their families sick. "Lots of Durangoans paid for that first atomic bomb with their health," Ellingson says. From 1986 to 1991, the U.S. Department of Energy removed tailings and other contaminated materials from the site and stabilized them in a disposal cell 3.5 mi southwest of Durango.

In the 1950s, Hollywood, attracted to the region's diverse and stunning landscape, began making westerns there. The region and the train were showcased in a variety of movies, including *Ticket to Tomahawk*, *Viva Zapata*, and *Around the World in 80 Days*. Parts of the 1969 classic *Butch Cassidy and the Sundance Kid* were filmed in the area, the title characters taking their famous leap from the Baker's Bridge granite.

The movies got people curious about where the landscape was, Ellingson says. While the D&RG—which had since become the Denver & Rio Grande Western Railroad—had "just about abandoned all its narrow-gauge lines" in the 1960s, he says, the seeds of a tourism economy were being planted. During the latter part of the 1960s, the Durango & Silverton was registered as a National Historic Landmark and was designated a national historic civil engineering landmark in the ASCE Historic Civil Engineering Landmark Program in 1968. In 1969 the D&RGW abandoned the tracks south of Durango, isolating the line and leaving its future in question. But during the Durango & Silverton's centenary, in 1981, the railroad sold the line to a businessman and train enthusiast, Charles Bradshaw, who began to restore the tracks and locomotives. "The route is exactly the same," says Ellingson. "The canyon is exactly the same. It's almost like time travel."

The Durango & Silverton Narrow Gauge Railroad and Museum offers tours along the entire route from May through October, as well as a shorter trip during the winter months. Ellingson says that anything can happen in the canyon—that's part of the thrill of taking the train. "When you go through that cut at Rockwood where the high line starts, there's no other access except by rail. You're completely cut off in the wilderness."

The rail museum estimates that more than \$300 million in precious metals have been transported along this short 45 mi route. Union Pacific acquired the successor of the original railroad in 1996. Palmer, who became a well-known philanthropist after his retirement, died in 1909.

"The story of the construction is addicting," Ellingson says. "You realize these men came out here and basically carved this whole place out with hand tools. It was really amazing what they were able to do." —T.R. WITCHER



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